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REVIEWS.

The Non-Metallic Minerals. By G. P. MERRILL, New York: JOHN WILEY & SONS, 1904.

THE non-metallic minerals, exclusive of gems, building-stones, and marbles, are treated in groups as elements, sulphides, oxides, etc. The nature and composition, the geological and geographical occurrence, the theories of the origin, and the uses of each mineral are presented, and in the case of the more important minerals commercially a brief description is given of the methods of mining and the preparation for the market. A valuable feature of the book to those who are making a study of special minerals is a bibliography giving complete references to articles and books on the various subjects. The occurrence of minerals, their forms of crystallization, and many other features are illustrated by numerous half-tones, diagrams, and geological sections. The author has rendered a most important service to all who are in any way interested in the non-metallic minerals by bringing together in a most concise manner much valuable information which until now was so widely scattered that it could be obtained only with great difficulty.

G. F. K.

Geology of Miller County. By SYDNEY H. BALL AND A. F. SMITH. With an Introduction by E. R. BUCKLEY. Vol. I, Second Series. Jefferson City, Mo.: Missouri Bureau of Geology and Mines. 1903.

THIS is a report of 207 pages with 18 plates and sufficient figures to afford ample illustrations. Two maps accompany the report, the first one a geological map purely, and the second one an economic map showing locations of mines, quarries, clay-banks, etc. Many of the figures consist of detailed columnar sections of the different formations.

Miller county is located in the midst of the Ozark plateau, and the succession of formations is typical for most of the plateau region. The formations occurring in the county are the Proctor limestone, probably of Cambrian age; the Gunter sandstone, Gasconade limestone, Bolin Creek sandstone, St. Elizabeth formation, Jefferson City formation, and Pacific sandstone, of undifferentiated Cambro-Ordovician age; the undiffer-

entiated Jefferson City and Coal-Measure shale, Burlington limestone, Graydon sandstone, Saline Creek conglomerate, and coal and Coal-Measure shale, of Carboniferous age; and the alluvium, of Pleistocene age.

The field-work on the report under review was begun in November, 1901. At that time there were forty-nine counties for which reports and maps had never been issued; forty-nine counties for which general reconnaissance reports had been published; one for which a complete detailed report had been published; and twenty parts of counties for which detailed reports had been published. It is the purpose of the Survey to issue reports in detail upon the forty-nine counties for which no reports have been published, and under this scheme the report on Miller county is the first to appear, although the field-work has been done in two other counties. County reports are to be issued in preference to sheet reports, because it is the belief that they serve better the interests of the citizens of the state. It is the general plan of the Survey to extend the county surveys to the southwest, southeast, northeast, and northwest, thereby connecting with the surveys of the lead, zinc, and coal fields of the state.

In the *Geology of Miller County* all phases of the subject are discussed in considerable detail. In the chapter on the physiography of the region the different types of surface relief are first described, and the relations of physiographic types to industrial and social conditions are set forth in a brief but very interesting way. The major portion of the report is then taken up with careful descriptions of the different geological formations, dealing with their areal extent, thickness, bedding, weathering, composition, texture, relations to adjacent formations, porosity, color, fossils, topography, etc. A chapter is devoted to a discussion of structure, with folding and flexing, faulting, jointing, and unconformities as sub-headings. Another chapter deals with the origin of chert and dolomite. The final chapter is given over to economic considerations, and consists of descriptions of the manner of occurrence, origin, and other characteristics of barite, building-stone, clay, coal, iron, ore limestone, lead, and zinc, road materials, sand, silica, soils, etc.

The Geological Survey of Missouri has been in existence for a good many years and has issued some excellent reports. It has done a notable service to the people of the state, and to it also the geologists of the country are indebted. The volume just issued will be of great value to the citizens of Miller county, and will be well received by all persons without the county who are interested in geology. The report is written in such a way that it can be used in the public schools of the state, and is hence of direct educational value. It is so complete in its treatment of the subject that another

report upon the county will not be needed for many years. A topographic map would have increased the value of the report, and no doubt the reader without the state who is unfamiliar with Missouri geography (as is the case with the reviewer) would appreciate a small index map showing the exact location of Miller county. It is a source of regret that where the matter has been so well prepared the proof-reading should have been so carelessly done, and that the proportion of misspelled words should be so large as a necessary consequence.

H. L.